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Absence of Commissurotomy Symptoms with Agenesis of the Corpus Callosum

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Surgical section of the neocortical commissures in man produces behavioral and neurological symptoms. Their detection, however, requires the use of performance tasks which specifically involve cross integration of cerebral processes, separately lateralized to the right and left hemispheres. To compare the effects of callosal deprivation by surgery on the one hand and by developmental anomaly on the other, a series of tests, on which commissurotomy patients were found to be moderately to severely impaired, was administered to another patient with callosal agenesis. The patient, a twenty year old college student, had previously been hospitalized with acute hydrocephalus secondary to aqueductal stenosis. Complete absence of the corpus callosum was inferred from contrast studies. She improved rapidly after shunt installation and was discharged with no gross neurological deficits.

In a simple examination unit, the subject's gaze is centered on a designated fixation point on a projection screen. Pictures of objects, words, or other visual stimuli are then tachistoscopically flashed to the left or right visual half fields. Assorted objects are also placed behind the screen for blind palpation by either hand. The tests employed measure the subject's capacity with respect to: cross recognition between the right and left halves of the visual fields and between the right and left hands, verbal description of the subordinate visual half fields and of objects in the subordinate hand, crossed tactual retrieval for stimuli presented to the visual half fields, cross replication of hand and finger postures, and location of crossed mirror points on the hands and fingers. On all the foregoing tests, the normal test scores of the agenesis patient contrasted sharply with the severely impaired performance of the commissurotomy patients. The implications of these observed differences with respect to current concepts of cerebral organization will be discussed.